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ON

CLOSURE OF THE OSTIUM

IN

INFLAMMATION AND ALLIED DISEASES OF THE FALLOPIAN TUBE.

BY

ALBAN DORAN.

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ON CLOSURE OF THE OSTIUM IN INFLAMMATION AND ALLIED DISEASES OF THE FALLOPIAN TUBE.

By ALBAN DORAN.

(Received September 26th, 1889.)

(*Abstract.*)

THE author, in this communication, dwells on the frequency of closure of the ostium in salpingitis; but the obstruction is often temporary. Obstruction of the uterine end is due to swelling of the mucous membrane or to the development of "Chiari's bodies" from that membrane. Permanent closure of the tube is almost synonymous with closure of the ostium. Salpingitis and perimetritis are the causes of closure of the ostium. Three essential factors in relation to the subject are considered at length. 1. The nature of the ostium and its fimbriæ. 2. The nature and varieties of salpingitis, and also of perimetritis as far as it affects the tube. 3. The precise manner in which the ostium is closed in perimetritis and salpingitis. In adhesive perimetritis the fimbriæ of the tube are bound down by bands, which thus obstruct the ostium. In salpingitis the ostium is obstructed, incompletely at first, by the swelling of the mucous membrane which involves the fimbriæ; but permanently in bad cases by great infiltration of the submucous tissue and middle coat, which swell over the ostium and cover in the fimbriæ. The perimetritic and salpingitic varieties of closure of the ostium, often blended, are demonstrated by specimens and diagrams. The question of timely conservative operations on obstructed non-suppurating tubes is discussed. Dr. Skutsch's "salpingostomy," where a small piece of the tube is excised, appears to be a promising step in that direction.

TEMPORARY or permanent closure of the Fallopian tube at the ostium is certainly the rule in salpingitis, and in perimetritis in the immediate neighbourhood of the ostium. In appendages removed for old inflammatory disease of the ovary the tube is often found thickened and tortuous, whilst the ostium appears to be open. Nevertheless the canal is more or less obstructed by the swelling of its mucous membrane. On the subsidence of this inflammation this source of obstruction would, no doubt, disappear in similar cases where the tube is not removed, and where the inflammatory process, so far as it affects the tube, proceeds no further. In this manner must end many mild cases of salpingitis, cases where the symptoms are hardly severe enough to cause more than a trifling amount of discomfort to the patient. The uterine end of the tube is very prone to obstruction, through swelling of the mucous membrane in salpingitis, just as the nasal fossæ are obstructed in coryza and influenza. The tumefied mucous coat bulges freely when the walls of the diseased tube are cut through. That this swelling, and with it the obstruction, should disappear together with the inflammation is not surprising. Stricture of the uterine end of the tube, after the manner in which the ostium is so often closed, is impossible owing to the anatomical characters of the part; though a perimetritic band pressing on the tube near its uterine end may obstruct the canal at that extremity. Chiari's bodies,* which may cause obstruction, are results of salpingitis. There is no evidence that they fail to undergo atrophy as the inflammation subsides.

With the ostium the case is different. When it is closed, changes more serious and more frequently permanent than swelling of the complicated mucosa occur, although that swelling is probably constant. Hence closure of the tube is all but synonymous with closure of the ostium. Exceptional cases where the ostium remains open may be dismissed. I dwelt upon this rare condition

* "Zur pathologischen Anatomie des Eileiterkatarrhs," 'Prager Zeitschrift für Heilkunde,' vol. viii.

in a communication published in a recent volume of the Society's 'Transactions.'* Salpingitis and its complications must not be confounded with hæmatosalpinx, where the ostium is often not only open, but also dilated.† Tubal gestation usually causes sufficient inflammation to seal up the ostium ; but in a recent case I found the ostium open, and the fimbriæ almost normal.

The cause of closure of the ostium is salpingitis or perimetritis. In cases of solid and cystic tumours of the ovary and uterus it is never closed unless one or both of these conditions be also present ; otherwise the tube is elongated and stretched, but not obstructed. In tumours of the parovarium and broad ligament this stretching of the tube is extreme. The fimbriæ are involved, the ovarian fimbria attaining a length of two, three, or four inches—indeed, I have seen it even longer. The ostium, so far from being closed, is abnormally patulous.

In relation to the subject of this paper, some of the pathological changes occurring in salpingitis and perimetritis must be carefully considered. By salpingitis I mean inflammation of the tube ; by perimetritis I wish to signify inflammation of the peritoneum in its neighbourhood. Three essential factors must be duly considered in detail.

1. The nature of the ostium and its fimbriæ.
2. The nature and varieties of salpingitis, and also of perimetritis as far as it affects the tube.
3. The precise manner in which the ostium is closed in perimetritis and salpingitis.

When the first and second are clearly understood, the third factor, the subject of this communication, is not difficult to explain. Before they are understood we cannot hope to attempt the conservative surgical treatment of diseased tubes. The ultimate aim of surgery in this

* "Papilloma of the Fallopian Tube, and the Relation of Hydroperitoneum to Tubal Disease," vol. xxviii, 1886, p. 229.

† See "Report on Dr. Playfair's Specimen of Small Ovarian Cyst and Hæmatosalpinx," in the Society's 'Reports,' vol. xxxi, p. 162

respect should be the removal of the obstruction without amputation of the tube.

What is the ostium, and what are its fimbriæ? Dr. Arthur Farre's classical article in Todd's 'Cyclopædia' contains a description of the naked-eye appearances of the tube which has never since been surpassed, and a series of drawings of that structure which could not be excelled. The manner in which the serous coat joins the mucous membrane of the tube, the transitions of the plicæ of the tubal canal into the fimbriæ outside the ostium, and the precise nature of the ovarian fimbria, are described and depicted with equal fidelity. To Richard, however, must be given the credit for the illustrations of the tube which adorn Dr. Farre's admirable monograph. Dr. Farre did wisely in selecting such woodcuts as Figs. 404, 405, 407, and 408, for they demonstrate what Richard had already discovered, the great variety in the development of the fimbriæ, especially the ovarian fimbria.

Nevertheless we must not rely on literature and art alone, even when sanctioned by so high an authority as Dr. Farre. On that principle I have made a fresh series of dissections, and taken sketches of them, or caused drawings to be prepared by Mr. Lewin; for Richard's woodcuts, especially Fig. 405 in Dr. Farre's monograph, err through being a trifle too diagrammatic.

I made the sketch, Fig. 1, from a well-developed tube attached to an ovary which was removed as it showed signs of cystic disease. The opposite ovary had become a large cyst. The tube was split open and sketched under water when fresh; for alcohol causes the plicæ and fimbriæ to become pale and shrink. The plicæ are, as Richard long ago demonstrated, elevated and ineffaceable folds of mucous membrane, like the valvulæ conniventes, excepting that they run in the long, not the short, axis of the canal in which they lie. As they pass beyond the ostium they become larger and multiply; sometimes two fimbriæ formed by division unite again. After close inspection of many hundreds of specimens I have come

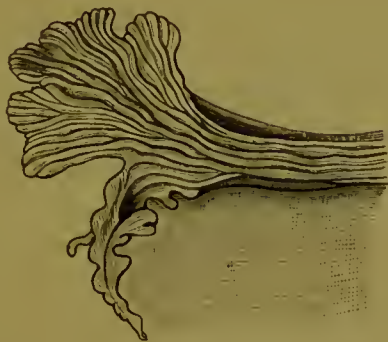


FIG. 1.—Ostium of normal Fallopian tube laid open, showing the continuation of plicæ into fimbriæ, and the dichotomous division of the fimbriæ. The ovarian fimbria is well formed.



FIG. 2.—End of tube with ostium laid open. The plicæ are prolonged as in Fig. 1, and continued to the end of the ovarian fimbria.

to the conclusion that this multiplication is mainly by dichotomous division. I have indicated the division in Fig. 1; it is best seen near the free extremities of the fimbriæ. I admit that a plica sometimes appears to spring up from the mucous membrane beyond the limits of the ostium. This condition, however, probably represents atrophy of a portion of an intratubal plica behind it, for a plica of this class, ending bluntly at or behind the ostium, is generally to be found in a straight line with a plica which appears to lie entirely outside the ostium. Careful examination of the grooves between the plicæ will enable the observer to trace the particular intratubal plica to which each fimbria belongs. There is another order, so to speak, of secondary plicæ which spring from the sides of the primary plicæ forming the fimbriæ. They give rise to the arborescent appearance seen in microscopic sections of the tube at the ostium. On the other hand, the two divisions of a primary fimbria may join again, as is often seen above the ostium within the tubal canal.

In Fig. 2, where the tube has also been laid open for some distance above the ostium, the extension of the plicæ into the fimbriæ is further demonstrated. In Figs. 1 and 2 it is seen that the plicæ are prolonged on to the ovarian fimbria. Fig. 3, a fine sketch by Mr. Lewin, shows extreme subdivision of the plicæ beyond the ostium. Some of the fimbriæ are prolonged as slender, thread-like bodies. These long filaments, together with true accessory fimbriæ springing from the broad ligament, play a conspicuous part in some cases of perimetritis and salpingitis, binding down the tube to neighbouring organs.

The anatomist can readily understand why, when the plicæ pass outside the ostium, they attain large dimensions, blossoming into fimbriæ. No longer cribbed and confined within the firm and narrow walls of the tube, they expand freely in the peritoneal cavity. A similar condition is seen in accessory ostia. The plicæ bulge freely through these abnormal orifices (see Fig. 4; see also "Malformations of the Fallopian Tube," 'Trans.



FIG. 3.—A specimen similar to Figs. 1 and 2. Some of the fimbriae are prolonged so as to form filamentous structures.

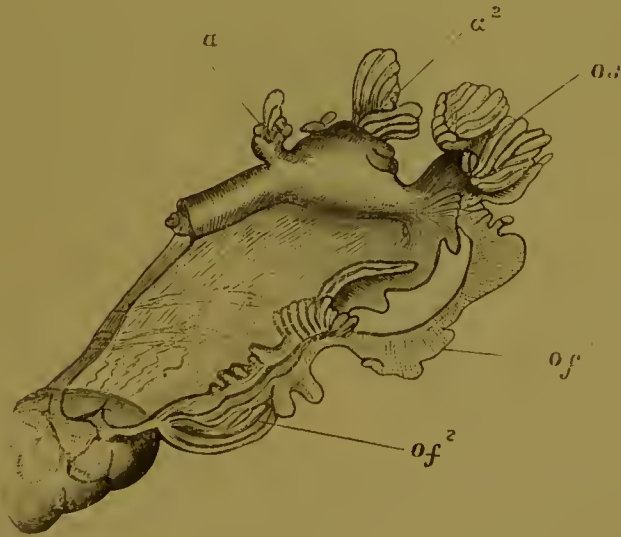


FIG. 4.—End of a tube with two accessory ostia, a^1 , a^2 , through which the plicæ bulge, forming fimbriae as at the normal ostium (*os*.) The ovarian fimbria is reduced to a thin band above (of^1), and highly developed below (of^2).

Obst. Soc.,' vol. xxviii, 1886, Fig. 5, p. 173). This bulging of the plicæ is important in relation to "salpingostomy." When an artificial opening is made and the tube collapses, the plicæ may possibly bulge out of it, after a time, as they bulge from accessory ostia.

The ovarian fimbria, which runs along the free border of the broad ligament to be attached to the surface of the ovary, being placed in the best position for free development, is often large and conspicuous. There is a conspicuously well-developed variety of the ovarian fimbria, bearing three, four, or more secondary plicæ which are sometimes continuous with intratubal plicæ, as in Fig. 2, sometimes entirely cut off from the tube, as in Fig. 4. The peritoneal attachment may atrophy more or less completely, so that the ovarian fimbria forms a loop (Fig. 4). In its commonest variety the ovarian fimbria forms a fringe like an elongated leaf, the peritoneal attachment usually running close to one of the free borders of the fimbria (Fig. 5). A third or atrophic type of ovarian fimbria



FIG. 5.—An ovarian fimbria moderately developed; about six times natural size. The plicæ are distinct but low. The dotted lines, *pa*, represent the attachment of the edge of the peritoneum, which lies close to one (*fb*¹) of the free borders (*fb*¹, *fb*²) of the fimbria. *ov*, ovary.

is not rare. The fimbria is reduced to two or three wattles lying along a groove in the border of the broad

ligament; a double row of these wattles is often seen on the surface of a thin-walled broad ligament cyst between the ostium and the ovary. Each row may be separated by the distance of half an inch when the cyst is full, and between them the plicæ of this fimbria often form long red streaks. The ovarian insertion of the fimbria forms a cord-like structure, not always devoid of the evidence of plicæ.

As Müller's duct, originally closed, undergoes cleavage to form the ostium, the ovarian fimbria represents the opened-out canal of the duct along the line of cleavage. The liberated plicæ bloom into fimbriæ in the manner already indicated. A reversal of this process takes place when the ostium is closed.

On inspecting the tube sideways its peritoneal coat is seen to end abruptly along a line corresponding to, or rather representing, the ostium. This line runs obliquely from above downwards and outwards, ending inferiorly at the beginning of the ovarian fimbria. The outer borders of the primary plicæ forming the fimbriæ are attached to this line of peritoneum. In rare instances, as Farre has already noted, the peritoneum is prolonged on to the base of a fimbria for some distance. This relation of the peritoneum to the fimbriæ and ostium is important to understand before we study the closure of the tube in disease. It will be shown further on how the swollen fimbriæ, in the early stage of salpingitis, project abnormally beyond the ostium, and how, later on, the walls of the tube, infiltrated with inflammatory products, bulge over the fimbriæ along the line where the serous coat ceases.

The natural relations of the fimbriæ to the ovary will presently be discussed.

The normal characters of the fimbriæ which surround the aperture termed the ostium having been considered, the two diseases, perimetritis and salpingitis, which so often cause the closure of the ostium, must next be taken into account.

By perimetritis I signify what general pathologists

would term pelvic peritonitis, and what precisians among specialists might prefer, as far as the subject of this paper is concerned, to call perioöphoritis or even perisalpingitis. I have selected the expression perimetritis, as employed so conveniently by Dr. Matthews Duncan. Perimetritis, as here understood, may be either an anatomical district, so to speak, of a wide area of generalised adhesive peritonitis, or an absolutely localised adhesive inflammation of the peritoneum, arising from various causes. I limit the term simply to the adhesive form. This perimetritis may be secondary to any uterine disease, to ööphoritis, to salpingitis, or to inflammation of a pelvic cyst or solid tumour.*

Adhesive perimetritis binds down the tube to the ovary, crumpling up, as it were, the mesosalpinx or portion of broad ligament between those structures. Effacement of the mesosalpinx in this manner is of necessity due to perimetritis, even when that disease is secondary to salpingitis. This fact must not be forgotten. Another form of effacement of the mesosalpinx will presently be described; it is essentially the direct result of dilatation and hypertrophy of the tube. In perimetritis thin but dense bands may bind down the tube at one or more points, causing more or less complete obstruction. Accessory fimbriæ often play a share in this process. Most pertinent to the main question, however, is the fact that perimetritis often closes the ostium by direct means. A band of adhesion grows over the fimbriæ or holds them down. Of this complication more will be said.

As to salpingitis, a full description of its different varieties would be out of place. I have examined over a hundred diseased tubes, and find that the varieties of salpingitis, as described by Martin, Orthmann, and others, often but not always represent early or late stages of the same disease. The mucous membrane is, as a rule, first involved in the inflammatory process which extends to

* I have seen, especially in one case, very old perimetritic deposits covering all the pelvic viscera, yet neither tube was obstructed.

deeper structures. Yet an almost purely interstitial salpingitis, where the tube is thick, hard, yet unobstructed, certainly exists, and so little is the mucous membrane involved that the disease in question may be considered as primary. Hydrosalpinx and pyosalpinx are complications secondary to closure of the tube.

In salpingitis the inflamed mucous membrane becomes swollen, hence the plicæ appear thickened very early in the disease. The fimbriæ are soon involved in this process, and often seem as though half strangulated at the ostium. This appearance, very conspicuous at operation, is rapidly destroyed by the action of spirit. Lymph exudes freely from the inflamed surface, forming bands which bind fimbriæ together. This suggests a delicate pathological subtlety, as to whether these bands be salpingitic or perimetritic. Putting aside technical terms, it may be said that the effusion of organised lymph is due to inflammation of the tube at first, for it is seen in the plicæ within the tube, protected from perimetritic changes, as well as in the fimbriæ. As this process, however, goes on in a region where an inflamed mucous surface opens on to a serous membrane, the latter must soon become involved, throwing out organised lymph. This swelling and semi-strangulation of the fimbriæ cause more or less obstruction, never permanent unless complicated by conditions which will presently be described. Even in mild cases of catarrhal salpingitis this swelling is never entirely absent,* hence more or less temporary obstruction of the ostium must occur.

Within the tube yet another change is observed in salpingitis of more or less severity. The submucous tissue is involved, it becomes œdematous. The swelling extends more or less to the connective tissue of the muscular coat and to the subserous coat. This represents the "inter-

* Here the observer must be reminded that the tube must be examined in the subject in order to see this swelling. After removal of the tube, the blood draining away, the engorgement of the fimbriæ disappears. For reasons given above, spirit preparations throw no light on this subject.

stitial salpingitis" of Martin and Orthmann. The inflammatory infiltration is especially important at the line of demarcation between the peritoneum and the fimbriæ at the ostium. Here, as will presently be further demonstrated, it causes the most essential and permanent form of closure of the ostium. The process also accounts for the disappearance of the fimbriæ.

In relation to occlusion of the tube two more subjects are worth consideration, namely, the approximation of the occluded and distended tube to the ovary and the natural and the abnormal relations of the ostium to the same organ.

The manner in which the tumour is approximated to the ovary by perimetritic adhesions has been described. The crumpling up of the mesosalpinx is easily demonstrated. That portion of the broad ligament may be unrolled, as it were, when the specimen is examined by the pathologist, if it has not been already torn away from its adhesions to the ovary during the process of removal of the parts at operation or after death. Salpingitis with obstruction brings the tube and ovary into more intimate relations. The distended tube opens up the layers of the mesosalpinx until its walls touch the ovary, just as a burrowing ovarian cyst opens up the same serous layers until its walls touch the tube. A broad ligament cyst burrows in the same manner till it touches the tube above and the ovary below. This process, which may be termed the burrowing of the tube, can be readily demonstrated on an ordinary hydrosalpinx. Monprofit, who has described the process with great accuracy,* terms it *le dédoublement du mésosalpinx*.

The tube does not float above the ovary in the living subject, with its fimbriæ mostly pointing upwards, backwards, and forwards, the ovarian fimbria running directly downwards. That position is purely diagrammatic. The tube forms a high arch over the ovary, which lies in the pelvis with its long axis not horizontal but more or less oblique, according to the position of the uterus. The uterine half of the tube rises, the outer half descends and

* 'Salpingites et Ovarites,' Paris, Steinheil, 1888.

bulges freely behind and external to the ovary. Thus the ovarian fimbria runs upwards towards its insertion on the ovary. The outer aspect of the ovary is covered by the other fimbriæ. Those which are represented in diagrams as the highest are naturally the lowest. The ostium looks inwards towards the ovary. Hence, when obstructed by the special changes which occur in salpingitis, it is found more or less closely applied to the swollen ovary. The mesosalpinx, passing across the arch made by the tube, forms a kind of veil or cover to the upper part of the ovary, to which it may often be seen adherent by perimetritic bands.

Were the tube really placed in its diagrammatic relations, it would assume a very different appearance when obstructed and dilated. It would form a pyriform tumour, the narrow end being close to the uterus, the broad end looking upwards and outwards. The ovary would be pulled up by the ovarian fimbria. The reverse change of position actually occurs. The obstructed extremity of the dilated tube presses against the ovary; in extreme dilatation it coils round the outer aspect of that organ, and may even extend downwards and inwards below it.

This bulging of the outer end of the tube around and even below the ovary is the cause of great confusion in many cases of tubal gestation, where the changes in the tube outside the foetal cyst are essentially salpingitic. The foetus appears to lie far from the tube, apparently in or outside the ovary, when in reality it lies within the outer part of the tube. This fact must not be forgotten when we read accounts of "undoubted ovarian gestation." The relations of the fimbriæ are best displayed when the fellow-ovary to an ovarian cyst is inspected in the live subject, an inspection I have had the advantage of noting several hundred times. The subject is fully demonstrated in Prof. His's "*Lage der Eierstöcke*" ('*Archiv für Anat. u. Phys., Anat. Abtheil.*, 1881).

After the above facts relating to the tube and its diseases are recognised, the precise manner in which the

ostium is more or less permanently closed is easily explained. It is occluded either by bands of lymph which cover in the fimbriæ, or by changes within the walls of the tube, which cause much swelling, so that the walls bulge and close in over the fimbriæ. The first process is essentially a part of the pathological changes constituting perimetritis. I shall therefore term it, for the sake of simplicity, "perimetritic closure of the ostium." The second process is a part of the condition known as salpingitis, and may be termed "salpingitic closure of the ostium." As perimetritis and salpingitis are often combined, both generally take a share in closing the ostium.

Perimetritic closure is the simpler form. A little deposit covering the delicate fimbriæ as they lie on the surface of the outer aspect of the ovary is sufficient to bind them down, and then the ostium necessarily becomes closed as soon as the deposit is organised. In operations for chronic disease of the appendages the early stage of the process is often observed. Sometimes, on scraping away the bands of lymph, the fimbriæ come in sight, well-formed, succulent, and bright red, being full of blood. In that case little or no salpingitis is present.

The accompanying sketch (Fig. 6) represents an extremely typical example of pure perimetritic closure of the ostium of the right tube. The fimbriæ, well formed and exuberant, were stuffed into a deep pouch on the outer side of the ovary, formed by a stout band of membrane. In the drawing, the fimbriæ are displayed as they appeared after I pulled them half out of the pouch. A black bristle passes out of the ostium into the pouch. Before the parts were disturbed the ostium lay deep in the pouch, looking towards the ovary, and of course completely obstructed. The tube was tortuous, and kinked by some firm perimetritic bands. The patient was married and thirty-six years of age; her youngest child was over four years old. For a year she had been subject to severe menorrhagia, ending in incapacity for work, and great pain during an action of the bowels. The appendages

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As desired in your letter
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2 blocks (Figs. 24 and 25) which you
kindly lent to us for use in Dr Roberts'
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We are

Yours faithfully

J. & A. Churchill
D.P.

Dr. A. Doran



FIG. 6.—An ovary and tube, showing obstruction of the ostium by perimetritic deposit which forms a deep pouch. The fimbriæ have been partly pulled out of the pouch. A bristle passes into the pouch out of the ostium.

4564 a



FIG. 7.—Complete obstruction of the ostium, the result of salpingitis. The end of the tube has been detached from the ovary below and the ostium forcibly opened; a bristle passes out of its orifice. The tissues of the tube have swollen over the ostium, completely concealing the fimbriæ, excepting the ovarian fimbria which is seen below the bristle. Behind and above the bristle are perimetritic bands, which must not be mistaken for fimbriæ.

4564 b.

were removed by Dr. Bantock in March, 1888. The right, represented in Fig. 6, lay high in the hypogastrium, and were not bound to any adjacent structure. The left tube and ovary were adherent to the peritoneum deep down in Douglas's pouch.

Salpingitic closure of the ostium is well displayed in Fig. 7. At a glance its distinction from the perimetritic form becomes evident. The end of the tube has been peeled off the ovary, to which it adhered, and lifted upwards so as to display the obstruction. No fimbriæ can be seen excepting the ovarian fimbria. A bristle occupies the ostium, which has been forced open. Around the bristle the tubal walls, extremely thickened, bulge freely. The fimbriæ now lie within the tubal canal, as may be seen in Fig. 8; in fact, they have been reduced to plicæ.

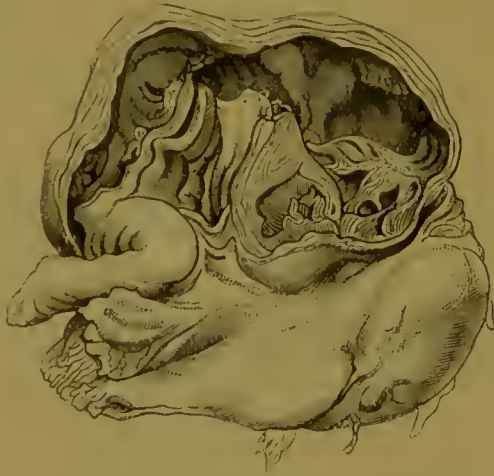


FIG. 8.—An obstructed and dilated tube laid open. The fimbriæ are seen, entirely included within its cavity.

They have not retracted—indeed, they could not retract, like the tentacles of a sea-anemone; the infiltrated tubal walls have closed over them. Before the parts were disturbed in Fig. 7, the bulging extremity lay against the outside of the ovary; the œdematous ovarian fimbria

running upwards. In more advanced cases that fimbria becomes reduced to a thin band. Perimetritic bands are seen on the surface of the tube in Fig. 7,* but they take no direct part in closing the ostium. The patient, also under the care of Dr. Bantock, was twenty-three years of age; the symptoms were very similar to those in the last case, whence Fig. 6 was taken.

The next drawing, Fig. 8, shows the position of the fimbriæ in salpingitic closure of the ostium. The external appearances resembled those in Fig. 7. Part of the wall of the tube has been cut away, displaying the distended canal. The remains of the fimbriæ are seen lying close to the side of the ostium. They are continuous with the plicæ, or rather are reduced to plicæ through lying within the tube, just as plicæ become fimbriæ when they protrude beyond an accessory ostium. The pressure of the fluid contents of the distended tube has caused them to atrophy.† This condition, whether it occur in salpingitic or perimetritic closure of the ostium, must be taken into account in relation to conservative operations on diseased tubes. If the plicæ and fimbriæ be destroyed, it is hard to see how the tube can ever become available for its functions. If the plicæ and fimbriæ reappear after the obstruction to the tube has been relieved, we may reasonably hope that the tube may become as sound as before the earliest onset of salpingitis. The inner wall of a long-distended tube generally consists of a glossy cicatricial tissue. This does not offer a favourable prospect for the restoration of the mucosa. Yet the epithelium is not so rapidly destroyed as the observer might at first be led to believe. In a pair of tubes greatly dilated and disused for many years I found papillomata covered with well-formed columnar epithelium,‡ nor, I find, is the epithelial investment of the mucosa always absent in a very tense hydrosalpinx.

* One such band lies close behind the bristle, and must not be mistaken for a bunch of fimbriæ.

† Simple stretching of the tubal wall cannot efface the plicæ.

‡ See 'Trans. Path. Soc.,' vol. xxxix, pl. xii, fig. 3.

The natural tendency of an obstructed tube is doubtless towards cure by relief of the obstruction, but the liability of the patient to repeated attacks of pelvic inflammation too often prevents cure in this manner. The tube being spoilt, in the sense above indicated, it tends to undergo changes such as I have described in two recent communications to the 'Transactions of the Pathological Society,'* Uniform cystic degeneration of tube and ovary is the typical ending of chronic disease of the appendages, but surrounding complications are infinite, and interfere with the steady reduction of tube and ovary to a double or even single cyst. It is clear that in advanced stages of tubal disease where the ovary is thus disorganised the tube is spoilt; indeed, if it could be restored to its functions it would be useless.

We must lastly consider the chances of restoring the tube to its uses before it is spoilt. I have witnessed operations where the peritoneal cavity has been opened, and diseased tubes freely handled, the fimbriæ being carefully inspected as the best landmarks to guide the operator in distinguishing the relations of the parts much confused by disease. In each of these particular cases the surgeon, fearing to remove the tubes, closed the abdominal wound, and the patient made a good recovery, declaring herself cured long after the operation. In some of these instances the cure may have been due to thorough (though hardly intentional) opening of the ostium, no perimetritis or salpingitis following the operation so as to close the ostium once more. Still, evidence on this point is very doubtful, for there are many sources of fallacy. The freedom from former bad symptoms after the operation does not, in these cases, necessarily prove that the tubes have been restored to their functions, for these good results often follow total removal of the tube, and sometimes ensue when the tubes are left absolutely untouched. The incomplete or conser-

* "A Pair of Chronic Inflamed Uterine Appendages, illustrating the Development of Tubo-ovarian Cysts," vol. xxxviii, p. 241; "Papilloma of both Fallopian Tubes and Ovaries," vol. xxxix, p. 200.

vative operation above noted leaves too much to chance, for the breaking down of adhesions around the ostium is likely to cause enough irritation to set up fresh inflammation, which would rapidly seal up the ostium again. The dangers of any incomplete operation are considerable, even in simple cases of recent obstruction. In pyosalpinx no such proceeding could be justified. Lastly, the pains and dangers to which the patient is exposed in diseases of the tube may not be entirely due to tubal obstruction.

The draining of a pyosalpinx through an abdominal incision may prove satisfactory in some cases, but it does not restore the tube. The most promising method of restoring an obstructed, non-suppurating tube to its functions is perhaps that suggested by Dr. Skutsch, of Jena, and carried into effect by him in one case with fairly satisfactory immediate results. He has devised an operation which he terms "salpingostomy." It was described before the third meeting of the Deutsche Gesellschaft für Gynäkologie at Freiburg in June, 1889 (see 'Centralblatt für Gynäk.,' No. 32, 1889). He operated upon a sterile patient, aged thirty-eight, with moderate dilatation of both tubes, which is said to have caused great pain, the ovaries and uterus being apparently free from disease. Some of the fluid contents of each tube were first withdrawn by means of a Pravaz syringe, and found to consist of clear yellow serum free from pus. The ostium was then laid open, the fluid allowed to escape, and an oval piece of the wall, about one square centimetre in size, cut away. The mucous membrane and serous coat were united along the margin of the artificial aperture by fine silk thread. Lastly, a sound was passed through the aperture along the tubal canal into the uterus. Convalescence was uninterrupted. "From the day of the operation forward the woman was free from pain."

The principle of salpingostomy is sound, and should the plicæ be restored through the relief of tension, it is highly probable that those near the artificial opening would ultimately bulge and form fimbriæ, just as is seen, as already

described, in accessory ostia. Dr. Skutsch recognises the dangers of the operation and the necessity for further experience. Its benefits must be restricted to a small number of cases where alone it can be justifiable. The stage of salpingitis where it can be performed can hardly be diagnosed excepting by opening the peritoneum with a view to more radical measures if necessary.